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**HEADLINE:** New Technique Narrows Hunt for **Gamma-Ray** Blazars

**BODY:**
NASHVILLE, Tenn., May 28 [AScribe Newswire] -- In the quest to peel back the mysteries of some of the most compelling physics in the cosmos, the enigmatic high-energy **gamma-ray** blazar - a jet spouting from a giant black hole - promises new insight into some astrophysical phenomena that, tantalizingly, seem to be just beyond the grasp of astronomers.

But pinpointing such blazars with ground-based **gamma-ray** telescopes, the kind of telescope that might reveal some of the tightly held secrets of the rare, very high-energy **gamma-ray** species of blazar, is a difficult, highly inefficient process. Few are known.

Now, however, thanks to new optical techniques developed by a team of astronomers at the University of Wisconsin-Madison, the world's **gamma-ray** telescopes may be able to quickly zoom in on this unusual type of blazar instead of wasting valuable telescope time searching the skies for their telltale signatures.

In general, blazars are a class of information-rich objects that can shine across the electromagnetic spectrum - from radio to very high-energy **gamma rays** in some cases. In the optical, most look very much like a star, a simple point of light in the sky. Most blazars are found at cosmological distances, billions of light years away.

A species that may be especially rich in information is known as the TeV **gamma-ray** blazar because it emits **gamma rays** at extremely high energies. Some of these high-end blazars are relatively close at hand, a mere 300 million light years from Earth. But when **gamma-ray** telescopes scan the sky, they have a hard time homing in on the point sources that may be emitting the **gamma rays.**

**"With gamma-ray** telescopes, you can observe a source for three months before you get a signal," says Ramotholo Sefako, a UW-Madison astronomer who, with Wisconsin colleague Eric Wilcots, today presented research results that could make it far easier for astronomers to find TeV blazars. With these new techniques, "we can tell which objects are likely to be high-energy objects. Our aim is to correlate optical and **gamma-ray** results," Sefako says.

The astronomers, who used the 1.0-meter telescope at the South African Astronomical Observatory, shared their findings at the 202nd meeting of the American Astronomical Society in Nashville. The team presented results on observations of eight objects and described optical techniques that would cut the identification time for a high-energy blazar from three months to a day.

The ability to quickly home in on blazars emitting **gamma rays** at TeV energies using ground-based optical telescopes promises a wealth of new objects for study by astronomers using **gamma-ray** telescopes. With more known high-energy **gamma ray** blazars to choose from, astronomers can use scarce **gamma-ray** telescope time to study what are considered to be some of the most unusual objects in the cosmos instead of spending time combing the skies for them.

Blazars exist at the cores of galaxies. And while no one knows for sure what lies at their cores, current thinking is that an enormous black hole - perhaps a billion times more massive than the sun - creates light-years-long jets of plasma that stick out from the poles of a torus created by an accreting disk of material spinning into the black hole. It is these jets that are believed to be the source of the high-energy **gamma rays** that interest astronomers.

Viewed at the right angle, blazars could provide a unique window to a black hole, says Wilcots: "The jet may be a way to get a look right down to the core, a view that is otherwise obscured by the torus of these objects."

An ability to drill down to the core of these objects, Sefako notes, may yield insight into the physics of black holes, including a more detailed understanding of accretion disks behavior, the physics of the jets themselves and perhaps even be the key to discovering the origin of cosmic rays.

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